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10/583,339	10/02/2006	Johanna Buchert	Q95484	9733
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SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			EXAMINER CALANDRA, ANTHONY J	
			ART UNIT 1741	PAPER NUMBER
			NOTIFICATION DATE 08/02/2011	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/583,339

Applicant(s)

BUCHERT ET AL.

Examiner

ANTHONY CALANDRA

Art Unit

1741

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 May 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 and 18-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 and 18-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-940)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Detailed Office Action

The communication dated 5/20/2011 has been entered and fully considered.

Claims 1, 18 and 19 have been amended. Claims 17 and 24 are cancelled. Claims 1-16 and 18-23 are currently pending.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-3, 5-8, 11, 18-20, and 22-23 are rejected under 35 U.S.C. 102(b) as being anticipated by, *A review on Interface Modification and Characterization of Natural Fiber Reinforced Plastic Composites* by GEORGE et al. hereinafter GEORGE.

As for claims 1-3, GEORGE discloses treating natural lignocellulosic materials [pg. 1472 column 1 Table 1 and section 2] with a modification agent comprising two functional groups, multifunctional silane, X_3Si-R [pg. 1474 column 1 section 5.2.1] which bonds to the cellulosic material surface. GEORGE teaches natural fibers [pg. 1462 column 2 section 4.]. GEORGE also teaches that natural fibers having lignin present therein, as such phenolic groups are present [pg. 1472 column 1 section 2.]. This treatment allows for better bonding with thermoplastics [pg. 1472 column 2 section 4].

The silane modifying agent has multiple functional groups; the first functional group, X, can react with hydroxyl groups on the celluloses surface. The second group, R, is compatible

with the resin. GEORGE discloses aminopropyl as one of the functional R groups. GEORGE further discloses the presence of organic peroxides which are oxidants.

GEORGE states that the R group forms a covalent bond with the polymer [pg. 1474 column 1 section 5.2.1].

As for claims 5, 6, and 23 GEORGE discloses an aminopropyl group [pg. 1474 column 1 section 5.2.1]. A propyl group is a chain of three carbon atoms.

As for claim 7, GEORGE discloses that the first functional group can be methoxy or ethoxy groups which are carboxy groups [pg. 1474 column 1 section 5.2.1].

As for claim 8, GEORGE discloses that there are 3 first functional X groups present [pg. 1474 column 1 section 5.2.1].

As for claim 11, GEORGE discloses that dispersion aids can be added, thus the modifying agent is added in the form of a dispersion [pg. 1474 column 1 section 5.2.1 second paragraph].

As for claims 18 and 19, GEORGE discloses the addition of organic peroxides. Peroxides degrade into oxygen gas and water.

As for claim 20, GEORGE discloses organic peroxides [pg. 1474 column 1 section 5.2.1 second paragraph].

As for claim 22, the reaction sequences are carried out sequentially [pg. 1474 column 1 section 5.2.1 first paragraph].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 1-16 and 18-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,187,136 PEDERSEN et al., hereinafter PEDERSEN in view of U.S. Publication 2002/0096282 LEIBLER et al., hereinafter LEIBLER.

As for claim 1, PEDERSEN discloses activating fibers with an oxidizing agent capable of activating the phenolic groups [abstract, column 8 lines 25-37]. PEDERSEN further discloses attaching to the oxidized sites a modifying agent such as Ferulic acid [column 5 lines 20-36 and column 8 lines 55-60]. PEDERSEN specifically states that the Ferulic acid can have alkyl substituents, the alkyl substituents are hydrophobic groups [column 5 lines 13-20]. The claims only require a hydrophobic group. PEDERSEN discloses that modified lignocellulose has a higher electronegative charge [column 8 line 63- column 9 lines 3 and column 10 lines 55-60] and this higher negative charge allows cationic (positively charged) polymers to bind to the more negatively charged pulp more effectively. PEDERSEN discloses cationic wet strength agents such as cationic starch and cationic polyacrylates [column 9 lines 4-9]. PEDERSEN discloses that by performing this treatment the lignocellulose is able to retain a larger amount of the cationic polymer while using less of the cationic polymer [column 3 lines 25-32]. PEDERSEN discloses strengthening agents but does not disclose hydrophobic wet-strength polymers that are thermosetting or thermoplastics.

LEIBLER discloses treating paper with cationic (positive charge) resin PAE mixed with a dispersion of thermoplastic polymers [abstract, claim 24 and 0020]. At the time of the invention it would have been obvious to the person of ordinary skill in the art to substitute the wet-strength composition of LEIBLER for the wet-strength composition of PEDERSEN. The person of ordinary skill in the art would be motivated to do so to since the composition of LEIBLER allows for high addition of wet strength needed for certain classes of paper types [0002] and the mixture of LEIBLER gives a high wet strength as compared to PAE alone [0092-0093]. Additionally the person of ordinary skill in the art would expect enhanced compatibility with

PEDERSEN as LEIBLER states that low negative charges limit PAE addition, however, PEDERSEN increases negative charge thus enhanced compatibility would be expected [0008].

As for claims 2, 3, 12, and 13, PEDERSEN discloses the reaction of fiber with an enzyme capably of catalyzing oxidation of phenolic structures [column 8 lines 25-30]. An enzyme is a type organic catalyst. PEDERSEN discloses the modifying agent of Ferulic acid which is grafted onto the pulp [column 10 lines 60-65]. Ferulic acid is a chemical which is capable of providing the lignocellulose fiber material with properties reducing the susceptibility to yellowing. PEDERSEN discloses that the enzymatic oxidation process occurs together and that the Ferulic acid is grafted onto the material, therefore the modifying agent is activated [column 8 lines 15-25 and column 10 lines 60-65].

As for claims 4 and 14, PEDERSEN discloses the range of 0.1 to 40% consistency [column 5 line 5-7] encompassed by the instant claimed range.

As for claims 5-9 and 23, PEDERSEN discloses that Ferulic acid, the modifying agent, is grafted onto the material [column 10 lines 60-65]. Ferulic acid is an unsaturated carboxylic acid with a chain of over 2 carbon atoms that has a carboxyl functional group, a phenolic group and a hydroxyl functional group. PEDERSEN additionally teaches that the Ferulic acid can have alkoxy substituents such as methyl, ethoxy and propoxy groups with have 1, 2, and 3 carbon atoms in the chain, respectively [column 5 lines 13-20].

As for claim 10, PEDERSEN discloses phenolic derivatives of benzoic acid including hydroxybenzoic acid [column 5 lines 31-33]. PEDERSEN further discloses that the phenolic ring can have one or more hydroxyl substituents on the phenol ring. Gallate is a hydroxybenzoic acid with 3 hydroxyl substituents on the phenol group. As PEDERSEN discloses the genus

hydroxybenzoic acid (at least 1 hydroxyl) and discloses that the phenol ring can have one or more hydroxyl groups, it is the examiner's position that it would be obvious to try the species of three hydroxyl groups (gallic acid) as there are a limited number of hydroxyl groups that can be placed on a hydroxybenzoic acid (1-5 hydroxyl groups). Additionally, PEDERSEN specifically discloses the species of 4-hydroxy-3-5dimethoxybenzoic acid. This is a derivative of gallic acid with substituted alkyl groups on the original 3 and 5 hydroxyl group [column 5 lines 35-36].

As for claim 11, PEDERSEN discloses that the Ferulic acid is added as a solution which the examiner has interpreted as a disperse system, or dispersion [column 10 lines 25-30].

As for claims 15 and 16, PEDERSEN discloses laccase, oxidases and peroxidases [column 6 lines 1-36].

As for claims 18 and 20, PEDERSEN discloses hydrogen peroxide [column 8 lines 4-10].

As for claim 19, PEDERSEN discloses oxygen and oxygen containing gases [column 7 line 65 to column 8 line 3].

As for claim 21, it is not clear the steps or the amount of radiation emitted onto the fiber, or consistency of the fiber. As paper web/pulp are subjected to light on a paper machine, at least some light radiation (including UV) strikes the pulp/paper web capable of oxidizing a phenol group. Examiner notes peroxide with ultraviolet light forms hydroxyl radicals, an advanced oxidation process.

As for claim 22, PEDERSEN discloses that the reaction can take place simultaneously or sequentially [column 4 lines 10-35].

3. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over *A review on Interface Modification and Characterization of Natural Fiber Reinforced Plastic Composites* by GEORGE et al. hereinafter GEORGE.

As for claim 4, GEORGE states that the fibers are in a solvent and the fibers are dried [pg. 1474 column 1]. This suggests that the fibers are in a suspension. As the fibers are not dried the consistency is less than 95% (air dried paper has a consistency of about 90%). However, GEORGE does not disclose the exact consistency of the suspension. At the time of the invention it would have been obvious to the person of ordinary skill in the art to optimize the concentration of the fibers within the water through routine experimentation within the broad range claimed by the applicants.

Response to Arguments

In light of amendment the 112 1st and 112 2nd rejections have been withdrawn.

In the previous action dated 11/23/2010 PEDERSEN was withdrawn as it failed to disclose covalent bonding as required by the amended claims. The term covalent has been withdrawn from the claims and therefore the examiner reenters the rejections based upon PEDERSEN.

Applicant argues that GEORGE is grafting to cellulose and differs in that the target structure of the instant claims phenolic hydroxyl group is only present in lignin containing fibers.

GEORGE teaches natural fibers [pg. 1462 column 2 section 4.]. GEORGE also teaches that natural fibers having lignin present therein, as such phenolic groups are present [pg. 1472 column 1 section 2.].

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANTHONY CALANDRA whose telephone number is (571)270-5124. The examiner can normally be reached on Monday through Thursday, 7:30 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Daniels can be reached on (571) 272-2450. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Anthony J Calandra/
Examiner, Art Unit 1741

/Eric Hug/
Primary Examiner, Art Unit 1741